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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/492,789	01/28/2000	Takakazu Yano	01165.0770	1372
22852	7590	05/20/2004		
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 1300 I STREET, NW WASHINGTON, DC 20005			EXAMINER JORGENSEN, LELAND R	
			ART UNIT 2675	PAPER NUMBER 20

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

39/492,789

Applicant(s)

YANO ET AL.

Examiner

Leland R. Jorgensen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 15 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 15 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 18 is objected to because of the following informalities: Claim 18 describes “**date** drive power circuit” rather than “**data** driver power circuit.” Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 7 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 7 describes “an output terminal from which the data driver power voltage is outputted.” Claim 7, lines 5 – 6. This should read “scan driver voltage” rather than “data driver power voltage” to be consistent with the rest of claim 7. Otherwise the circuit described makes no sense in view of the specifications and claims.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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5. Claims 1, 2, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beeteson et al., USPN 6,177,915 B1, in view of Nonomura et al., USPN 6,115,021.

Claim 1

Beeteson teaches a power supply circuit, which has a scan driver power circuit for supplying a scan driver voltage to a scan driver [row driver 7] for scanning a liquid crystal display device and which has a data driver power circuit for supplying a data driver voltage to a data driver [column driver 8] for sending display data to the liquid crystal display device [LCD panel 1]. Beeteson, col. 4, lines 15 – 26, and figure 4. Beeteson teaches a brightness control circuit [PROM 36], provided in the scan driver power circuit for controlling brightness of the liquid crystal display device by changing the voltage level of the scan driver voltage, specifically by adding row correction value Y'' to row brightness value Y' . Beeteson, col. 4, lines 26 – 44; and figure 4.

Although it is inherent that the data driver of Beeteson has a power circuit, Beeteson does not describe the details including the temperature compensation circuit.

Nonomura teaches a voltage regulation circuit [compensation reference voltage generation circuit 33], provided in the data driver power circuit [temperature compensation power supply circuit 35], for regulating the voltage level of the data driver voltage V_d supplied to the liquid crystal display device to a predetermined value and a temperature compensation circuit [temperature sensor 30], provided in the data driver power circuit, for compensating a temperature characteristic of the liquid crystal display device by changing the voltage level of the data driver voltage. Nonomura col. 11, lines 33 – 37; col. 12, lines 5 – 32; and figures 9 and 10. See also Nonomura, col. 12, line 49 – col. 14, line 4; and figures 11 – 13.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the temperature compensation data driver power circuit as taught by Nonomura with the power supply circuit as taught by Beeteson to produce a large capacity display with a sufficiently high contrast that can be realized in a wider range of operation temperature.

Nonomura invites such combination by teaching,

In this example, the driving conditions for maintaining the memory angle at a constant angle can be obtained by provision of the temperature compensation power supply circuit 35. As a result, large capacity display with a sufficiently high contrast can be realized in a wider range of operation temperature.

Nonomura, col. 12, lines 33 – 38. See also: Nonomura, col. 6, lines 38 – 45; and col. 13, line 65 – col. 14, line 4.

Claim 2

Nonomura teaches an input power supply [power supply section 30] serving as a universal power supply. Nonomura, col. 12, lines 15 – 18; and figure 9. An amplifying element [buffer circuit 34 formed of an operational amplifier] has an input terminal connected to the input power supply and a control terminal and an output terminal from which the data driver power voltage V_d is outputted. Nonomura, col. 12, lines 19 – 32; and figure 10. An impedance element [fixed resistor 31] is connected between the input power circuit and the control terminal of the amplifying element. The voltage regulation circuit [compensation reference voltage generation circuit 33] and the temperature compensation circuit [temperature sensor 30] is connected to the control terminal of the amplifying element. Nonomura, col. 12, lines 5 – 32; and figures 9 and 10.

Claim 13

Nonomura teaches that the amplifying element is an operational amplifier. Nonomura, col. 12, lines 21 – 26.

Claim 18

It is inherent that the data driver power circuit [temperature compensation power supply circuit 35] shown by Nonomura in figures 9 and 10 would perform voltage regulation, temperature compensation, and power supply functions at the same time. Nonomura, col. 12, lines 5 – 32; and figures 9 and 10.

6. Claims 3 – 6 and 9 – 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beeteson et al. in view of Nonomura et al. as applied to claim 1 above, and further in view of Sakamoto et al., USPN 3,956,661.

Claim 3

Neither Beeteson nor Nonomura teach that the voltage regulation circuit and the temperature compensation circuit comprise a diode group.

Sakamoto teaches a voltage regulation circuit and the temperature compensation circuit that comprise a diode group having a plurality of series connected diodes connected between the control terminal of an amplifying element and ground. Sakamoto, figure 1; col. 2, lines 22 – 33. Sakamoto teaches a voltage regulation circuit and temperature compensation circuit. Sakamoto, figure 1; col. 2, lines 22 – 33. The temperature compensation circuit is connected to the control terminal of an amplifying element, a transistor 1 with a collector, base, and emitter. Sakamoto, figure 2; col. 2, lines 22 – 33.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the voltage regulation and temperature compensation circuit as taught by Sakamoto with the data drive power circuit as taught by Beeteson and Nonomura to create a temperature compensation data drive power circuit having a stable output voltage in varying temperature.

Sakamoto invite such combination by teaching,

The present invention relates to an improved D.C. power source for stabilizing an output voltage and/or current especially in integrated circuits (IC) and also for compensating for deviation or fluctuation in the current amplification factor h_{FE} or β of a transistor due to variation in the ambient temperature.

Heretofore, in a transistor circuit for supplying constant output voltage, a power supply voltage was divided by a pair of bias resistors including an emitter resistor in a transistor circuit built in an integrated circuit block, and the divided voltage was supplied to a transistor or transistors also built in the integrated circuit blocks. However, in a prior D.C. power source the compensation for preventing the change of the output voltage due to temperature change was not enough because the values of the resistances in the IC blocks were considerably varied by discrepancies among resistors as well as temperature variations, and it was very difficult to construct a transistor circuit in which an absolute value of the current flowing through a load was maintained constant.

Sakamoto et al., col. 1, lines 5 – 10. Sakamoto adds,

A main purpose of the present invention is, therefore, to provide a D.C. power source having a temperature compensation circuit in which variation in the voltage drop between the base and emitter of a transistor due to variation in the ambient temperature is compensated.

Another purpose of the present invention is to provide a D.C. power source having a temperature compensation circuit in which variation or deviation of the current amplification factor h_{FE} or β due to variation in the ambient temperature is compensated.

A still further purpose of the present invention is to provide a D.C. power source having a temperature compensation circuit in which the effect of variation in the ambient temperature on the output voltage and/or current compensated.

Sakamoto, col. 1, lines 29 – 45.

Claim 4

Sakamoto teaches that the series-connected diodes with a first diode having a cathode terminal connected to the control terminal of the amplifying element and a second diode with an anode terminal connected to the ground respectively. Sakamoto, figure 1; col. 2, lines 22 – 33.

Claim 5

Sakamoto teaches a circuit where the sum of the voltage drop of each diode, the voltage V_{B1} at the junction point (a), is equal to the data driver voltage V_{E1} . Sakamoto, col. 4, lines 2 – 6.

Claim 6

It would have been obvious to one of ordinary skill in the art at the time of the invention to use seven diodes in the diode group. Sakamoto invites one to vary the number of diode. After defining m as the number of diode between the control terminal and ground, Sakamoto states,

As described above, whenever the dividing ration of the D.C. power supply voltage V_{CC} is desired, the first and second resisters $R1$ and $R2$ and values of m and n are in turn determined. Thus the effect of the change of the voltage drop between the base and emitter V_{BE} of the transistor 1 due to temperature change is completely avoided by inserting a predetermined number of diodes 6.

Sakamoto, col. 3, lines 17 – 24. For one of ordinary skill in the art at the time of the invention, it is an obvious design choice, as motivated by the above teachings of Sakamoto, to choose a certain number of diodes to set an appropriate voltage drop.

Claim 9

Sakamoto teaches that the amplifying elements are transistors. Sakamoto, figure 2, col. 2, lines 22 – 33. Although Sakamoto does not specifically state in the specifications that the

transistors are bipolar, bipolar transistors would be inherent because the symbol of the transistor used in Sakamoto's figures are those typically used for bipolar transistors.

Claim 10

It would have been obvious to one of ordinary skill in the art at the time of the invention to use such a range. Sakamoto invites one to consider different resistances. Sakamoto, col. 3, lines 17 – 24. Sakamoto offers formulas to find such resistances. Sakamoto, col. 2, line 21 – col. 3, line 32. For one of ordinary skill in the art at the time of the invention, it is an obvious design choice, as motivated by the above teachings of Sakamoto, to choose a certain resistance to produce an appropriate current.

Claim 11

It would have been obvious to one of ordinary skill in the art at the time of the invention to use silicon diodes for the diodes of the diode group. Silicon diodes are readily available and well known in the art, as admitted in applicant's specification, page 2, lines 11 – 12.

7. Claims 7, 8, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beeteson et al. in view of Nonomura et al. as applied to claim 1 above, and further in view of Nishioka et al., USPN 6,121,943.

Claim 7

Nonomura teaches an input power supply [power supply section 30] serving as a universal power supply. Nonomura, col. 12, lines 15 – 18; and figure 9. Nonomura also teaches an amplifying element [buffer circuit 34 formed of an operational amplifier] that has an input terminal connected to the input power supply and a control terminal and an output terminal

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from which the data driver power voltage V_d is outputted. Nonomura, col. 12, lines 19 – 32; and figure 10. Although Beeteson does not specifically describe a input power supply serving as a universal power supply, such power supply would be inherent to provide the higher level voltage supply.

Neither Beeteson nor Nonomura teach the divider circuit between the input power supply and the ground for setting a voltage applied to the control terminal of the amplifying element.

Nishioka teaches a divider circuit between the input power supply and the ground for setting a voltage applied to the control terminal of the amplifying element. Nishioka, figures 4 and 6, col. 5, line 59 - col. 6, line 5. Nishioka teaches a variable resister 81b having a resistance variation terminal connected to the control terminal of the amplifying element. Nishioka, figures 4 and 6, col. 5, line 59 - col. 6, line 5.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the constant current control circuit of Nishioka to the display voltage supply circuit of Beeteson and Nonomura to create a scan driver power circuit. Nishioka points out that “It is an object of the present invention to solve the problems associated with the generation of heat and the rush current during the application of the scan signal while reducing the charging and discharging time.” Nishioka, col. 1, lines 54 – 57. Nishioka teaches the advantage of its power circuit for scan driver. “Thus, the constant current control circuit 81 performs control to provide a constant current in response to the control signal at a high level input from the input terminal S1. Nishioka, col. 6, lines 2 – 5.

Claim 8

Nishioka teaches a resistor 81c having a terminal connected to the input power supply. Nishioka, figures 4 and 6, col. 5, line 59 - col. 6, line 5. Nishioka teaches a Zener diode 81d having a cathode connected to the resistor and an anode to ground. Nishioka, figures 4 and 6 and col. 6, lines 19 - 21.

Claim 14

Nishioka teaches the use of bipolar transistors in the scan driver and the data driver. Nishioka, col. 8, lines 44 - 48.

Claim 15

Nishioka teaches the use of field effect transistors (FET). Nishioka, col. 5, line 59 - col. 6, line 5.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beeteson et al. in view of Nonomura et al. as applied to claim 1 above, and further in view of The Electrical Engineering Handbook.

Claim 12

Neither Beeteson nor Nonomura teaches that the amplifying elements are MOS transistors.

The Electrical Engineering Handbook teaches the use of MOS transistors. Handbook, p. 567 - 580.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use MOS transistors for transistors in the data driver power circuit of Beeteson and Nonomura.

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The Handbook teaches that MOS transistors allow easy fabrication using lithographic processes, resulting in integrated circuits (ICs), with very small devices, very large device counts, and very high reliability at low cost. MOS transistors also allow manufacture of complex systems without expensive packaging or cooling requirements. Handbook, p. 568.

Response to Arguments

9. Applicant's arguments with respect to claims 1 – 15 and 18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamaguchi et al., UPSN 5,307,084, teaches a brightness control circuit for an LCD display.

Kikuo et al., USPN 5,250,937, teaches voltage divider circuits including temperature control circuit for data driver for an LCD display.

Dingwall, USPN 5,739,805; Hotto, USPN 5,831,588; Endo, USPN 5,852,430; and Hamada et al., JP 03036519 A, each teach a temperature control circuit for a data driver for an LCD display.

Beeteson et al., UPSN 5,929,828, also teaches a brightness control circuit [contrast and color control means shown in figure 12], provided in the scan driver power circuit [shown in

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figure 11] for controlling brightness of a display panel by changing the voltage level of the scan driver voltage. Beeteson, col. 9, line 57 – col. 10, line 49; and figures 11 and 12.

11 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leland Jorgensen whose telephone number is 703-305-2650. The examiner can normally be reached on Monday through Friday, 7:00 a.m. through 3:30 p.m.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231


or faxed to:

(703) 872-9306

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, telephone number (703) 306-0377.

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DENNIS-DOON CHOW
PRIMARY EXAMINER